Chapter 1 Modeling Practice

Write an equation to illustrate the situation. Then, if asked, answer the question.

1) The cost for labor associated with fixing a washing machine is computed as follows: There is a fixed charge of $35 for the repairman to come to the house, to which a charge of $22 per hour is added.

2) In 1990 the number of factory pollution incidents reported in Country X was 9800. This number had decreased roughly at a rate of 560 per year since 1982. Estimate the year when there were approximately 14,700 incidents.

3) Two friends decide to meet in Chicago to attend a White Sox baseball game. Rob travels 240 miles in the same time that Carl travels 224 miles. Rob's trip uses more interstate highways and he can average 4 mph more than Carl. What is Rob's average speed?

4) A store is discounting all regularly priced items by 25%. Find the regular price of an item that costs $84.88 on sale.

5)In order to receive a B in a course, it is necessary to get an average of 80% correct on two one-hour exams of 100 points each, on one midterm exam of 200 points, and on one final exam of 500 points. If a student scores 91, and 85 on the one-hour exams, and 143 on the midterm exam, what is the minimum score on the final exam that the person can get and still earn a B?

6) Five friends drove at an average rate of 55 miles per hour to a weekend retreat. On the way home, they took the same route but averaged 65 miles per hour. What was the distance between home and the retreat if the round trip took 10 hours?

7) A car rental agency charges $150 per week plus $0.20 per mile to rent a car. How many miles can you travel in one week for $250?

8) An auto repair shop charged a customer $339 to repair a car. The bill listed $99 for parts and the remainder for labor. If the cost of labor is $40 per hour, how many hours of labor did it take to repair the car?

9) There are 14 more sophomores than juniors in an 8 AM algebra class. If there are 108 students in this class, find the number of sophomores and the number of juniors in the class.

10) Sergio’s internet provider charges its customers $13 per month plus 5¢ per minute of on-line usage. Sergio received a bill from the provider covering a 2-month period and was charged a total of $47.50. How many minutes did he spend on-line during that period?

11) Carla and Patrick rode stationary bikes for the same amount of time. Carla rode at 7 miles per hour, and Patrick rode at 5.5 miles per hour. If Carla rode 1.13 miles farther than Patrick, how long did they use the bikes?

12) You are traveling to your aunt's house that is 183 miles away. If you are currently twice as far from home as you are from your aunt's, how far have you traveled?

13) The president of a certain university makes three times as much money as one of the department heads. If the total of their salaries is $220,000, find each worker's salary.

14) A freight train leaves a station traveling at 32 km/h. Two hours later, a passenger train leaves the same station traveling in the same direction at 52 km/h. How long does it takes the passenger train to catch up to the freight train?

15) During a road trip, Tony drove one-third the distance that Lana drove. Mark drives 18 more miles than Lana drove. The total distance they drove on the trip was 298 miles. How many miles did each person drive?

16) A train ticket in a certain city is $1.50. People who use the train also have the option of purchasing a frequent rider pass for $17.25 each month. With the pass, each ticket costs only $0.75. Determine the number of times in a month the train must be used so that the total monthly cost without the pass is the same as the total monthly cost with the pass.

17) The cost of owning a home includes both fixed costs and variable utility costs. Assume that it costs $4562 per month for mortgage and insurance payments and it costs an average of $1.36 per unit for natural gas, electricity, and water usage.

18) In a certain city, the cost of a taxi ride is computed as follows: There is a fixed charge of $2.05 as soon as you get in the taxi, to which a charge of $1.60 per mile is added.

19) Gary can hike on level ground 3 miles an hour faster than he can on uphill terrain. Yesterday, he hiked 28 miles, spending 2 hours on level ground and 5 hours on uphill terrain. Find his average speed on level ground.

20) In a certain city, the cost of a taxi ride is computed as follows: There is a fixed charge of $2.05 as soon as you get in the taxi, to which a charge of $2.00 per mile is added. Find the cost of a 6-mile taxi ride.

21) Marty’s Tee Shirt & Jacket Company is to produce a new line of jackets with embroidery of a Great Pyrenees dog on the front. There are fixed costs of $510 to set up for production, and variable costs of $47 per jacket. Find the total cost of producing 132 jackets.

22) During a hurricane evacuation from the east coast of Georgia, a family traveled 260 miles west. For part of the trip, they averaged 50 mph, but as the congestion got bad, they had to slow to 20 mph. If the total time of travel was 7 hours, how many miles did they drive at the reduced speed?

1) C(x) = 35 + 22x

2) Y = -560(x - 1990) + 9800; 1981

3) 60 mph

4) F(x) = x - 0.25x; $113.17

5) 401

6) 297(11/12) miles

7) 500 miles

8) 6 hours

9) 61 sophomores; 47 juniors

10) The number of minutes is 430.

11) They each used the bikes for 0.75 hour.

12) 122 miles

13) President’s salary = $165,000; department head's salary = $55,000

14) 3.2 hours

15) Tony drove 40 miles, Lana drove 120 miles, and Mark drove 138 miles.

16) 23 times

17) Y = 1.36x + 54,744

18) C(x) = 2.05 + 1.60x

19) 6(1/7) mph

20) $14.05

21) $6714

22) 60 miles